CLAIMS

1. Steel superior in machinability comprised of, by wt%,

C: 0.005 to 0.2%,
Si: 0.001 to 0.5%,
Mn: .0.2 to 3.0%,
P: 0.001 to 0.2%,
S: 0.03 to 1.0%,
T.N: 0.002 to 0.02%,
T.O: 0.0005 to 0.035%, and

the balance of Fe and unavoidable impurities, said steel satisfying one or both of Mn/S in the steel being 1.2 to 2.8 or an area ratio of pearlite over a grain size of 1 μm in a microstructure of the steel being not more than 5% and a surface roughness Rz of the steel being not more than 11 μm.

2. Steel superior in machinability characterized by containing, by wt%, C: 0.005% to 0.2%, Mn: 0.3 to 3.0%, and S: 0.1 to 1.0%, by having a density of MnS having a circle equivalent diameter of 0.1 to 0.5 μm at a cross-section parallel to a rolling direction of the steel material, taken from an extraction replica and observed by a transmission electron microscope, of at least 10,000/mm^2, and by having a cut surface roughness Rz of the steel of not more than 11 μm.

3. Steel superior in machinability as set forth in claim 1 or 2, said steel characterized by further containing B:0.0005 to 0.05 wt%.

4. Steel superior in machinability as set forth in claim 1, said steel characterized by having a density of MnS having a circle equivalent diameter of 0.1 to 0.5 μm at a cross-section parallel to a rolling direction of the steel material, taken from an extraction replica and observed by a transmission electron microscope, of at least 10,000/mm^2.

5. Steel superior in machinability as set forth in

claim 1, said steel characterized by further restricting the amount of S to 0.25 to 0.75 wt% and the amount of B to 0.002 to 0.014 wt%, by containing amounts of S and B in a region surrounded by A, B, C, and D shown in FIG. 4 where the contents of S and B satisfy the following equation (1), and by containing sulfides with BN precipitated in MnS:

$$(B-0.008)^2/0.006^2+(S-0.5)^2/0.25^2 \leq 1 \quad \ldots \quad (1)$$

6. Steel superior in machinability as set forth in claim 1 or 2, said steel characterized by further containing, by wt%, one or more of,

V: 0.05 to 1.0%,
Nb: 0.005 to 0.2%,
Cr: 0.01 to 2.0%,
Mo: 0.05 to 1.0%,
W: 0.5 to 1.0%,
Ni: 0.05 to 2.0%,
Cu: 0.01 to 2.0%,
Sn: 0.005 to 2.0%,
Zn: 0.0005 to 0.5%,
Ti: 0.0005 to 0.1%,
Ca: 0.0002 to 0.005%,
Zr: 0.0005 to 0.1%,
Mg: 0.0003 to 0.005%,
Te: 0.0003 to 0.05%,
Bi: 0.005 to 0.5%,
Pb: 0.01 to 0.5%, and
Al: ≤0.015%.

7. A method of production of steel superior in machinability as set forth in any one of claims 1 to 3, said method of production of steel characterized by casting molten steel having the steel ingredients as set forth in claim 1, then cooling at a cooling rate of 10 to 100°C/min, then cooling at a cooling rate of at least 0.5°C/sec in a range from an A_3 point to 550°C.

8. A method of production of steel superior in

machinability as set forth in claim 4 or claim 5, said method of production of steel characterized by casting molten steel having the steel ingredients as set forth in claim 2, then cooling at a cooling rate of 10 to 100°C/min, restricting a finishing temperature of hot rolling to at least 1,000°C, then cooling at a cooling rate of at least 0.5°C/sec in a range from an A_3 point to 550°C.

9. A method of production of steel superior in machinability as set forth in any one of claims 1 to 6, said method of production of steel characterized by restricting a heating temperature for adjusting hardness to not more than 750°C after the cooling after the hot rolling.

10. A method of production of steel as described in any one of claims 7 to 9, wherein said steel is steel superior in machinability characterized by further containing, by wt%, one or more of,

V: 0.05 to 1.0%,
Nb: 0.005 to 0.2%,
Cr: 0.01 to 2.0%,
Mo: 0.05 to 1.0%,
W: 0.5 to 1.0%,
Ni: 0.05 to 2.0%,
Cu: 0.01 to 2.0%,
Sn: 0.005 to 2.0%,
Zn: 0.0005 to 0.5%,
Ti: 0.0005 to 0.1%,
Ca: 0.0002 to 0.005%,
Zr: 0.0005 to 0.1%,
Mg: 0.0003 to 0.005%,
Te: 0.0003 to 0.05%,
Bi: 0.005 to 0.5%,
Pb: 0.01 to 0.5%, and
Al: ≤0.015%.